Graduate School of
Business Administration

KOBE UNIVERSITY

ROKKO KOBE JAPAN

2015-25

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Discussion Paper Series

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Abstract

With the purpose of promoting clean development in developing countries, as well as increasing mitigation toward global warming issue, efforts have been made between government and companies through implementing Clean Development Mechanism and Joint Credit Mechanism projects. This study targets at identifying the determinants of the financial and environmental outcomes of CDM and JCM pilot projects, focusing on host party, project type, and project status. The CDM project data is collected for 11 years (2004 – 2014) from the Institute of Global Environmental Strategies whereas the JCM pilot project data covers 2 years (2013 – 2014) from Global Environment Centre Foundation. Result of this study shows that regarding JCM pilot projects, project type is a crucial determinant for environmental outcome. Meanwhile, regarding CDM projects, statistically significant determinants of environmental outcome are host party, project type, and project status. In terms of CDM financial outcome, only project type and project status show significant effects. It implies that there is no need for considering which country to implement CDM projects if the target is financial outcome. Instead of that, if aiming at projects' environmental outcome, for either CDM or JCM, it is necessary for companies to take project type/ sector into consideration.

Key words: Clean development mechanism; Joint crediting mechanism; Internal Rate of Return; greenhouse gas emissions; country and industry effects

JEL classification: F21, O13, Q54

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1. INTRODUCTION

Global warming has been viewed as one of the greatest threats to the survival of not only human beings but also other species in the world over the last few decades. Efforts have been made to reduce the emission of greenhouse gases (GHGs) by different means. Many developed countries have engaged in endeavors to reduce the amount of GHGs through modern technology. In terms of technology transfer related to the climate change issue, the Clean Development Mechanism (CDM) under the Kyoto Protocol has been widely implemented in developing countries since 2001. CDM allows emission-reduction projects in developing countries to earn certified emission reduction (CER) credits. As of June 2015, 1.6 billion CERs have been issued in the United Nations Framework Convention on Climate Change (UNFCCC) (2015).

However, along with the advantages of such actions, many drawbacks have been reported. For instance, large transaction costs make it difficult for projects to be accepted by host parties (Burniaux et al., 2009). In addition, the types of projects have also been a controversial topic of discussion. Recent studies on CDM also point out the role of host parties, which count a lot for the success of a CDM project (Winkelman and Moore, 2010). As there has arisen great criticism toward the real outcome of CDM, in recent years, a new mechanism regarding emission reduction has been developed. Originally developed by the Japanese Government, the Joint Credit Mechanism (JCM) is a means to facilitate the diffusion of leading low-carbon technologies, products, systems, services, and infrastructure as well as to implement mitigation actions regarding global environmental issues in developing countries.[1] As they were launched just in 2011 and carried on in 2014, more time is needed to see the real effectiveness of JCM projects.

The purpose of this research is to investigate the determinants of the success of both types of projects. Based on the literature review, several potential factors that affect the outcome of those projects are taken into consideration. So far, there have been a limited number of empirical

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[1] See explanation by United Nations Environment Programme
<http://www.cdmpipeline.org/overview.htm> [accessed in 19th July 2015].

studies taking financial or environmental outcomes of such projects into account; therefore, we study this aspect. Due to the lack of data, analysis of this study is divided into two elements. One is to examine the determinants of the annual reduction of GHG emissions in both CDM and JCM projects, carefully comparing CDM with JCM in terms of determinants such as the effects of country, industry, and project types. Another is to examine the determinants of the investment effectiveness of CDM. Specifically, this study focuses on the internal rate of return (IRR) of CDM projects. We consider the findings to be beneficial in forming the expectations of investment returns in JCM projects.

This paper is structured as follows. Section 2 explains the CDM and JCM and reviews the literature examining the successful determinants of CDM projects. Section 3 explains the methodology of this study. Section 4 shows empirical results and Section 5 concludes.

2. BACKGROUNDS

2.1 Clean Development Mechanism

In an endeavor to encourage developing countries to take part in the global mission of reducing GHG emissions, some environmental mechanisms have been developed by the UNFCCC. Along with the Joint Implementation and Emissions Trading, for a long time CDM has been considered an effective flexibility mechanism, which allows emission reduction projects in developing countries to earn CER credits, each equivalent to one tonne of CO_2 (IPCC, 2007). The CER credits then can be traded on the global market by industrialized countries to help them meet their goal of emissions reduction (UNFCCC, 1998).

The purpose of CDM is twofold. First, it supports parties which are not included in Annex I (developed countries) to achieve sustainable development and prevent dangerous climate change, which is the main objective of UNFCCC. Second, CDM assists Annex I countries to comply with the quantified emission limitation commitment (UNFCCC, 1998). By allowing the Annex I countries to buy CERs from emission reduction projects in developing countries, CDM enables the countries to reach part of their emission reduction commitment. Under CDM, industrialized countries could choose and buy the cheapest CERs (Grubb, 2003).

In accordanace with the Kyoto Protocol, CDM is designed based on the idea of emissions reduction production (Toth et al., 2001). The baseline, which defines the emission amount when no CDM project is proceeded, is set up by the CDM executive board. Upon subtracting the actual emission by the baseline, the CERs are calculated. As of July 2015, there have been more than 7647 registered[2]. Projects that attract the most investment are those that focus on energy and waste sectors. India and China are the biggest host parties, with the total share of more than 50% of the projects. By 2015, CDM projects have issued nearly 1.6 billion CERs.

2.2 Joint Credit Mechanism

The JCM was developed by the Japanese Government in an attempt to facilitate the diffusion of leading low carbon technologies, products, systems, services, and infrastructure as well as the implimentation of mitigation actions and contribution to sustainable development of developing countries. GHG emission reduction is calculated by applying measurement, reporting, and verification (MRV) methodologies, leading to contributions of Japan (Government of Japan, 2014).

Unlike the CDM, the JCM requires representatives from both governments. In the case of the JCM, rules and guidelines for the implementation of JCM projects are developed by the Joint Committee (JC). The JC determines if the project methodologies are approved or rejected. It then designates the third party entities to verify the projects. Based on the third party's validation, JC decides whether to register the project or not. Taking the insurance of credits by JC, governments issue the notified amount of credits to the registry. In addition, in contrast to CDM projects in which credits are tradable, JCM is a non-tradable credit type mechanism at the beginning. Both governments continue to consult until the mechanism reaches the transition to a tradable credit type mechanism.

Japan already signed a bilateral agreement of the JCM with several countries, including

[2] See the information platform managing by the program of Ministry of the Environment, Japan <http://www.mmechanisms.org/e/index.html> [accessed in 19th July 2015].

Vietnam, Mongolia, Palau, Bangladesh, Ethiopia, Kenya, Maldives, Laos, Costa Rica, and Cambodia. The first project was registered on October 31, 2014 in Indonesia. So far, 4 projects, mainly focused on energy saving, have been registered (Table 1).

2.3 Literature review

This sub-section reviews previous studies about CDM projects in terms of empirical studies. As JCM is a new mechanism and has just come into practice lately, there is no empirical literature about JCM published yet. Past research on the determinants of CDM success covers a wide range of issues. The following is dedicated to give brief descriptions of each of the studies.

Although there are several types of projects listed for CDM, one common characteristic is that the way of registering projects was imbalanced in terms of project types. Thomas et al. (2009) try to find the constraints to the development of each CDM project, especially focusing on the neglect toward afforestation and reforestation (AR). The results from the study reveal that the main reasons for the scarce number of projects on AR are limited financial support, poor administration, and government concern. By studying each of the 4 registered AR projects, it was implicated that successful CDM AR applications have the following two aspects. One is that large organizations with strong technical expertise guide initial funding support, design, and implementation of projects. Another is that revenue from CERs must be directed back to local communities. As a result, it is claimed that CDM should be reformed in order to support more development for AR projects.

Another issue recently addressed by researchers is that CDM projects are also unequally distributed among host countries. For example, most CDM projects have gone to emerging markets such as China, India, and Brazil, while very few host parties are the least developed countries. Winkelman and Moore (2010) investigate why CDM activities are differently distributed across countries in order to identify the country-level determinants for CDM projects to be chosen. Taking the sample of 58 host countries, the authors point out that human capital and GHG emission levels are the criteria that determine if a country is able to host a CDM project or not. By setting the number of projects and projects' CERs as a dependent variable, the authors find that countries that offer a growing market for CDM co-products, such as electricity, are more likely to become host CDM projects while those with higher carbon intensity levels have greater CER production.

Jung (2006) and Oleschak and Springer (2007) mark efforts of those researchers in ranking the host country attractiveness for CDM investment. Jung uses cluster analysis to rank 114 countries' attractiveness according to four levels: very attractive, attractive, attractive to a limited extent, and very unattractive. The three dimensions Jung provided are "the mitigation potential," "the CDM institutional capacity," and "the general investment climate." On the other hand, the study by Oleschak and Springer only takes investment risk factor into account. The risk factors of their category is summarized as follows: 1) CDM institutions including Kyoto Protocol ratification and designated national authority establishment, 2) national communications submitted to UNFCCC, 3) the number of capacity-building programs, understanding with other countries, 4) the presence of CDM in national communications, 5) CDM experience, and 6) the regulatory environment in the country.

In addition, according to Michaelowa and Jotzo (2005), CDM project size is affected by the huge transaction cost that mostly resulted from the difficulty in proving the additionality of projects. Evidence from emerging CDM projects shows that transaction costs can account for a significant share of the total cost of CDM projects. Furthermore, smaller projects will be at a disadvantage as fixed cost becomes a major factor. Additionally, as transaction costs are assumed to rise with the permit price in the market, some developing countries may decide not to enter CDM market if permit prices are low.

As discussed above, the success of CDM projects is largely affected by country and industry conditions. The difference in these conditions is shown as the fact that CDM projects are unequally distributed. Therefore, this study examines what factors, such as country, industry, and project type, affect financial (investment return) and environmental (i.e., expected CER size) outcomes. In examining these determinants of CDM and JCM, this study helps to form expectations regarding what types of policies or supports are needed in JCM in the near future. The following section explains our methodology to assess the determinants.

3. METHODOLOGY

3.1 Data

The study uses the CDM project data from the Institute of Global Environmental Strategies (IGES),[3] and the JCM pilot project data from the Global Environment Centre Foundation (GEC)[4]. While the CDM consists of 51 countries with 4051 observations that play the role of host party countries, the JCM contains 15 countries with 68 observations. The study analyzes 11 years (2004-2014) of data for the CDM and 2 years (2013-2014) of data for the JCM.

Table 2 shows descriptive statistics, and Figures 1, 2, and 3 show the numbers of cases by registration year (Fig.1), registration by types (Fig.2), and CER insurances by type (Fig. 3). These figures support the literature on the imbalance of project distribution by type. While there is a huge amount of projects on power and energy recovery, the number of afforestation, leak reduction, PFC reduction, and SF6 replacement projects are still limited.

3. 2 Regression methodology

This study aims to study the environmental and financial outcomes of the CDM and JCM projects. As proxy for the environmental and financial outcomes, this study adopts annual emission reduction (AER) and projects' IRR, respectively. For JCM, as projects have not been tackled yet, there is no IRR data for it; however, there is AER data (i.e., expected GHG reduction), calculated and provided by GEC.

To evaluate the CDM project, this study uses the following equations:

$$lnAER = \beta + \sum_i \beta_i D_i^{Country} + \sum_j \beta_j D_j^{Type} + \beta_k D^{Scale} + \sum_l \beta_l D_l^{Status} + e \quad (1)$$

[3] http://www.iges.or.jp/en/
[4] http://gec.jp/

$$IRR = \beta + \sum_i \beta_i D_i^{Country} + \sum_j \beta_j D_j^{Type} + \beta_k D^{Scale} + \sum_l \beta_l D_l^{Status} + e \quad (2)$$

where D denotes dummy variables. $D_i^{Country}$ denotes a dummy of country i. D_j^{Type} denotes a dummy of project type j, which consists of following 14 types (baseline is energy efficiency): AR, bio-fuels, biogas, biomass, cement, energy efficiency, fuel switch, hydro power, methane avoidance, methane recovery and utilization, other renewable energies, PFC reduction and substitution, SF6 replacement, waste gas/heat utilization, and wind power. D^{Scale} stands for a dummy variable that takes 1 if the project is large scale. D_l^{Status} denotes a dummy variable of project status (baseline is registered): rejected (l = 2) or withdrawn (l = 3). e denotes an error term.

This study next examines the determinants of the environmental outcome of the JCM pilot projects. Specifically, this study uses the expected GHG emissions reduction (i.e., AER) in the log form (lnGHG), which is reported in each project, as a dependent variable in the following regression model:

$$\ln AER = \beta + \sum_i \beta_i D_i^{Country} + \sum_j \beta_j D_j^{Type} + \beta_t + e \quad (3)$$

where β_t denotes the effects of year t. Note that, while the study used the projects' country (host party), type, status, and scale as independent variables for the CDM, country, sector, and year have been considered as independent variables for the JCM. D_j^{Type} denotes a dummy variable of project type j, which is reducing emission from deforestation and forest degradation (REDD+), renewable energy, transport, and waste management/biomass utilization (baseline is energy efficiency improvement).

4. Result

4.1 CDM projects' environmental efficiency (AER)

Table 3 shows the relationships between determinants of host party, project type, project scale, and project status with CDM projects' environmental outcome (lnAER). Firstly, the regression result demonstrates that determinants of the host party play an important role in determining the CDM project outcome. Thus, setting China as the baseline, Egypt, Iran, Nigeria, Moldva, Qatar, and South Korea show statistically significantly positive coefficients with AERs earned. In contrast, Bhutan-India, Brazil, Costa Rica, Cuba, El Salvador, Honduras, India, Kenya, Malaysia, Mexico, Syria, Thailand, the former Yugoslav Republic of Macedonia, United Arab Emirates, and Vietnam perform less productively in reaching a high CDM project environmental outcome.

In addition, the result also points out that the project type should definitely be appointed as one determinant of CDM project environmental outcome. As reported by Table 3, compared to energy efficiency chosen as a baseline, the AR project shows less AERs earning, whereas other projects (biofuels, biogas, biomass, fuel switch, methane recovery and utilization, other renewable energies, PFC reduction and substitution, SF6 replacement, waste gas/heat utilization, and wind power) bring more environmental outcome. Among those, biofuel and methane recovery and utilization raise the highest outcomes (i.e., largest coefficients) comparing to those others that are higher than China's.

Regarding project scale, large projects are found to produce more AERs than small ones. Likewise, in terms of project status, there is no difference in the environmental outcome among the registered, rejected, or withdrawn statuses.

4.2 CDM financial outcome (IRR)

Table 4 shows the regression result of using IRR. In terms of the coefficients of the host party dummies, the table indicates that there is little diversity among host parties. Among the 49 host parties surveyed (due to missing values), only the coefficient of Honduras is statistically significantly negative, indicating that Honduras is less efficient in the financial outcome compared to the baseline (i.e., China). On the other hand, the coefficients of the other host parties are not statistically significant, indicating that IRR is not different from that of China.

Regarding project type, setting energy efficiency as a baseline, biogas, biomass, and wind power are shown significantly negative coefficients, indicating that these 3 types are less effective in terms of investment. In addition, the scale dummy is not statistically significant, indicating that size does not relate to the financial outcome of CDM. Meanwhile, projects with rejected status are, like the environmental outcome analysis above, proven to be statistically significantly positive, indicating that the rejected projects may be overstated on purpose to pass the certification.

4.3 JCM projects' environmental outcome

Table 5 shows the relationship between determinants of the host party, the sectors, and their effects on GHG reduction. From the table, it can be speculated that the determinant of the host party has no effect on the environmental outcome of JCM projects. Similarly, the determinant of the year (2014) has no significant effect on the amount of AERs earned from this project type. Meanwhile, regarding the project sector, compared to the baseline chosen as energy efficiency, REDD + (afforestation and forest degradation) is expected to see a 557 percent greater increase in AER than the baseline. This indicates that sector is a crucial determinant to predict JCM environmental outcome.

5. CONCLUSION AND DISCUSSION

This study aims at identifying the determinants for efficient CDM and JCM projects from the viewpoint of project environment (AER) and investment (IRR) outcomes. This study finds that the determinants of AER in CDM and JCM differ. Regarding CDM environmental outcome (AER), the regression result shows that the coefficients of country dummies (baseline: China) are statistically significantly positive in 6 countries, significantly negative in 16 countries, and insignificant in 28 countries. In addition, the coefficients of CDM project type are also statistically significantly positive in 10 types, significantly negative in 1 type, and insignificant in 3 types. It indicates that the environmental outcome of CDM highly varies among countries and project type. On the other hand, in terms of the environmental outcome of JCM projects, the coefficients of host party dummies are not statistically significant. In addition, only the project sector REDD+ has a statistically significant positive coefficient with AER earned (baseline: Energy efficiency). This finding indicates that, at least in the current situation, the environmental outcome of JCM project is not considerably affected by country and type effects.

In terms of CDM investment outcome (IRR), country dummies (baseline: China) are statistically significantly positive in none of the countries, significantly negative in 1 countries (Honduras), and insignificant in the other countries. The coefficients of CDM project type are also statistically significantly negative in 3 types and insignificant in 11 types. This indicates that the IRR is not so different among the projects. In addition, the coefficient of the rejected status is statistically significantly positive, indicating that it may be overstated on purpose to pass the certification.

From the regression results, the following can be concluded. Firstly, compared to the CDM's AR, the JCM's REDD+ projects are expected to bring more environmental outcomes for companies. Because of this potential, there is greater opportunity for companies to invest in JCM instead of CDM in forestry projects. Also, if aiming at projects' environmental outcome, for either CDM or JCM, it is necessary for companies to take project type/sector into consideration. Secondly, the difference of host parties has no effect on CDM projects' IRR. Hence, there is no need to consider which country would implement CDM projects if the target is a financial outcome. Instead, companies should pay attention to project types, because certain project types, which are biogas, biomass, and wind power in this study, may not be financially efficient.

We also identify some limitations of this study. Firstly, there are some deficiencies in the dataset due to a lack of information. Data for JCM is estimated based on expectation, as JCM projects have not been implemented yet. It is still not precise and therefore lowers the credibility of comparison between the two mechanisms' projects. Hence, future research should be supported by actual data collected after the JCM projects are officially finished.

ACKNOWLEDGEMENT

This study was carried out as part of the SESAMI project in Kobe University and was supported by research grant from the Research Institute of Advanced Management. We would like to thank Masashi Yasuda, Ryuji Shimono, and all concerned members of Panasonic Corp. for arranging and coordinating our research survey.

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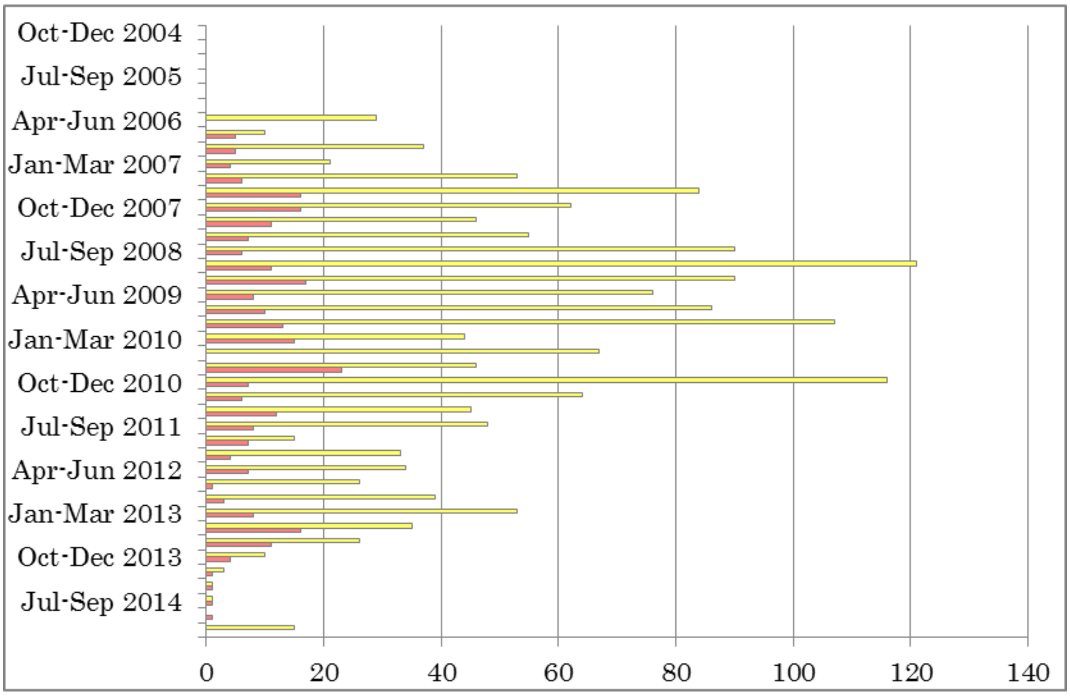

Figure 1 : Time series, number of cases (Registration)　(Sources: IGES)

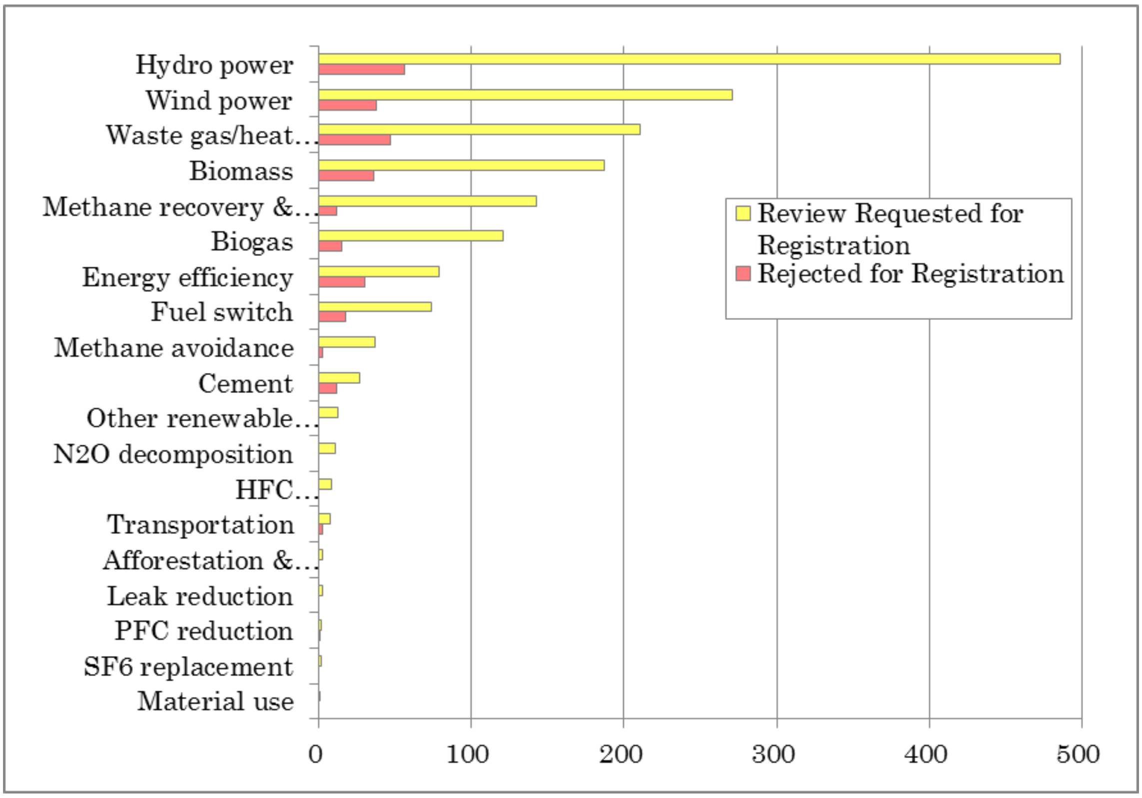

Figure 2 : Project type – Number of cases (Registration)   (Source : IGES)

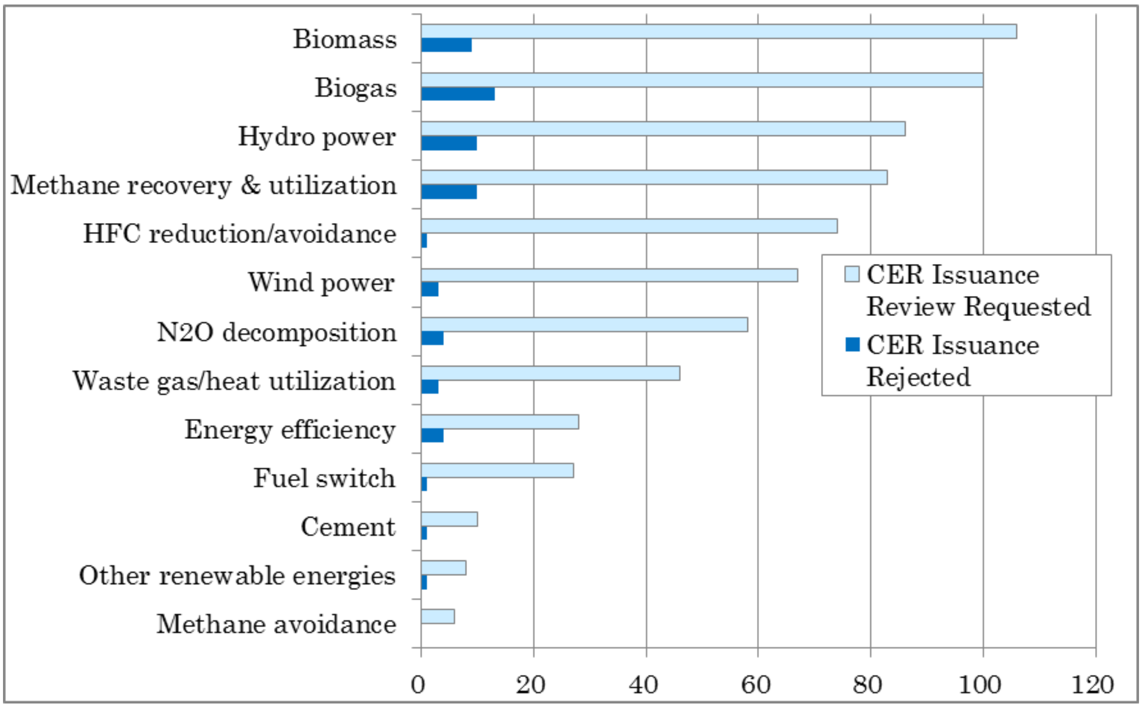

Figure 3 : Project type – number of cases (CER issuance)　(Sources: IGES)

Table 1 : Registered JCM projects

Country	Sector	Date	Project Title	Emission reduction (average ton/year)
Indonesia	Energy demand	31 October, 2014	Energy Saving for Air-Conditioning and Process Cooling by Introducing High-efficiency Centrifugal Chiller	114
Indonesia	Energy demand	29 March, 2015	Project of Introducing High Efficiency Refrigerator to a Food Industry Cold Storage in Indonesia	120
Indonesia	Energy demand	29 March, 2015	Project of Introducing High Efficiency 227Refrigerator to a Frozen Food Processing Plant	21
Palau	Energy industry	21 April, 2015	Small scale solar power plants for commercial facilities in island states	

Source: Progress of Financing Programme for JCM Model Projects and Feasibility Studies for JCM Projects by MOEJ in 2015 [accecced 19th July 2015].
http://gec.jp/jcm/jp/images/publications/JCM_booklet_2015June.pdf

Table 2. Desciptve statistics

Variable	Obs.	Mean	Std.Dev.	Min	Max
(CDM) IRR without CER	4439	0.703	0.188	−0.513	9.460
(CDM) IRR with CER	4082	0.116	0.058	−0.321	0.878
(CDM) IRR Benchmark rate	4488	0.099	0.028	0	0.3
(CDM) Annual ERs (ton CO_2/year)	4478	131649.2	223328	2181	3016714
(JCM) GHG reduction (ton CO_2/year)	66	153799.7	525736	1.7	3050000

Table 3 CDM projects (lnAER)

	Coef.	S.E.
Country dummies (baseline: China)		
Albania	1.003	(0.746)
Argentina	0.141	(0.431)
Armenia	0.849	(0.748)
Bangladesh	−0.600	(0.530)
Bhutan-India	−2.831***	(0.746)
Bolivia	−0.414	(0.528)
Brazil	−0.362***	(0.116)
Chile	−0.285	(0.334)
Colombia	−0.403	(0.249)
Costa Rica	−1.643***	(0.528)
Cuba	−1.456*	(0.747)
Cyprus	−0.287	(0.431)
Dominican Republic	−0.317	(0.745)
Ecuador	−0.648	(0.746)
Egypt	0.732*	(0.431)
El Salvador	−1.023**	(0.432)
Guatemala	−0.226	(0.336)
Honduras	−1.332***	(0.287)
India	−0.545***	(0.049)
Indonesia	−0.004	(0.084)
Iran	1.569**	(0.745)
Israel	−0.377	(0.377)
Jamaica	−0.740	(0.527)
Jordan	−0.246	(0.754)
Kenya	−1.577**	(0.746)
Lao PDR	−0.023	(0.282)
Madagascar	0.267	(0.746)
Malaysia	−0.350***	(0.096)
Mexico	−0.399**	(0.191)
Moldova	1.431*	(0.835)
Mongolia	−0.139	(0.528)
Morocco	0.474	(0.431)
Nicaragua	0.079	(0.431)
Nigeria	3.304***	(0.745)
Pakistan	0.409	(0.431)
Panama	−0.559	(0.527)
Peru	0.232	(0.239)
Qatar	3.254***	(0.745)
Republic of Korea	−0.285	(0.216)
Singapore	−0.532	(0.530)
South Africa	0.033	(0.336)
South Korea	1.657**	(0.750)
Sri Lanka	−0.921	(0.746)

Syria	−1.140**	(0.530)
Thailand	−0.346***	(0.088)
The Dominican Republic	−0.703	(0.747)
The former Yugoslav Republic of Macedonia	−1.956***	(0.754)
The Philippines	−0.193	(0.176)
United Arab Emirates	−1.144**	(0.528)
Viet Nam	−0.505***	(0.054)
Project type dummies (baseline: energy efficiency)		
Afforestation & reforestation	−0.812**	(0.378)
Biofuels	1.539**	(0.746)
Biogas	0.383***	(0.071)
Biomass	0.420***	(0.058)
Cement	0.012	(0.561)
Fuel switch	0.998***	(0.148)
Hydro Power	0.771	(0.746)
Methane avoidance	0.863	(0.746)
Methane recovery & utilization	1.387***	(0.116)
Other renewable energies	0.253***	(0.039)
PFC reduction and substitution	0.271***	(0.031)
SF6 replacement	0.576*	(0.343)
Waste gas/heat utilization	0.148*	(0.089)
Wind power	0.787***	(0.059)
Other dummies		
Large scale	1.301***	(0.030)
Rejected Status	0.049	(0.082)
Withdrawn Status	0.166	(0.174)
Constant	10.176***	(0.034)
obs	4478	
year	2004-2014	
Adj R-squared	0.4293	

Note: ***, **, and * stand for statistically significant levels at 1%, 5%, and 10%, respectively.

Table 4 : CDM project (IRR)

	Coef.	S.E.
Base IRR	0.861***	(0.155)
Country dummies (baseline: China)		
Albania	0.017	(0.186)
Argentina	0.004	(0.107)
Armenia		
Bangladesh	−0.058	(0.187)
Bhutan-India	0.026	(0.186)
Bolivia	0.021	(0.132)
Brazil	−0.026	(0.032)
Chile	−0.012	(0.083)
Colombia	−0.004	(0.070)
Costa Rica	−0.058	(0.131)
Cuba	−0.005	(0.186)
Cyprus	−0.022	(0.107)
Dominican Republic	−0.019	(0.185)
Ecuador	0.011	(0.186)
Egypt	−0.064	(0.107)
El Salvador	0.001	(0.108)
Guatemala	−0.097	(0.094)
Honduras	−0.126*	(0.075)
India	−0.012	(0.014)
Indonesia	−0.029	(0.023)
Iran	−0.163	(0.186)
Israel	−0.062	(0.108)
Jamaica	−0.009	(0.131)
Jordan	0.049	(0.188)
Kenya	0.018	(0.186)
Lao PDR	−0.003	(0.076)
Madagascar	0.017	(0.186)
Malaysia	−0.041	(0.026)
Mexico	−0.034	(0.048)
Moldova		
Mongolia	−0.023	(0.131)
Morocco	0.016	(0.107)
Nicaragua	−0.006	(0.107)
Nigeria	−0.112	(0.186)
Pakistan	0.010	(0.108)
Panama	−0.028	(0.131)
Peru	0.008	(0.060)
Qatar	0.017	(0.185)
Republic of Korea	0.008	(0.062)
Singapore	0.027	(0.132)
South Africa	0.040	(0.132)
South Korea	−0.227	(0.186)

Sri Lanka	0.025	(0.186)
Syria	−0.046	(0.133)
Thailand	−0.007	(0.023)
The Dominican Republic	0.027	(0.187)
The former Yugoslav Republic of Macedonia	0.017	(0.188)
The Philippines	−0.026	(0.047)
United Arab Emirates	0.005	(0.185)
Viet Nam	0.002	(0.015)
Project type dummies (baseline: energy efficiency)		
Afforestation & reforestation	−0.010	(0.094)
Biofuels	−0.097	(0.186)
Biogas	−0.045**	(0.018)
Biomass	−0.032**	(0.015)
Cement	−0.038	(0.139)
Fuel switch	−0.036	(0.038)
Hydro Power	−0.032	(0.186)
Methane avoidance	−0.041	(0.186)
Methane recovery & utilization	−0.025	(0.029)
Other renewable energies	−0.013	(0.010)
PFC reduction and substitution	−0.005	(0.008)
SF6 replacement	0.000	(0.132)
Waste gas/heat utilization	−0.028	(0.023)
Wind power	−0.063***	(0.015)
Other dummies		
Large scale	0.003	(0.008)
Rejected Status	0.213***	(0.021)
Withdrawn Status	0.018	(0.043)
Constant	−0.009	(0.016)
obs	4432	
year	2004-2014	
Adj R-squared	0.0297	

Note: ***, **, and * stand for statistically significant levels at 1%, 5%, and 10%, respectively.

Table 5. JCM projects (lnAER)

	Coef.	S.E.
Country dummies (baseline: Indonesia)		
Bangladesh	−1.489	(1.440)
Cambodia	0.458	(2.024)
Costa Rica	2.511	(3.208)
Ethiopia	3.347	(2.792)
Indonesia & Myanmar	0.826	(2.774)
Kenya	1.551	(1.943)
Lao PDR	0.346	(1.826)
Maldives	−2.289	(2.118)
Mongolia	1.142	(1.120)
Myanmar	0.263	(1.758)
Palau	−2.742	(2.075)
Sri Lanka	2.081	(2.023)
Thailand	2.407	(1.961)
Vietnam	1.557	(1.016)
Project type dummies (baseline: energy efficiency)		
REDD+	5.570***	(1.366)
Renewable Energy	0.926	(0.978)
Transport	−2.648	(1.795)
Waste Management /Biomass Utilisation	1.452	(1.110)
Year dummy of 2014	0.276	(0.717)
Constant	6.964***	(0.730)
obs	66	
year	2013-2014	
Adj R-squared	0.238	

Note: *** stands for statistically significant levels at 1%.

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